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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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INTEL CORPORATION

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P.O. BOX 52050

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EXAMINER

MITCHELL, JASON D

ART UNIT

PAPER NUMBER

2193

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/783,787	Applicant(s) KINNEY, MICHAEL D.	
	Examiner Jason Mitchell	Art Unit 2193	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to an amendment filed on 2/26/09.

Claims 1-6 and 8-27 are pending in this application.

Response to Arguments

Applicant's arguments filed 2/36/09 have been fully considered but they are not persuasive.

In the par. bridging pp. 8 and 12 the applicant states:

The Office Action cites column 6 lines 22-25 of Nakajima as teaching the limitation "flattening the firmware module by replacing existing content within at least one field within the MS-DOS header of the firmware module with fill data that is more compressible than the existing content." (See Office Action dated September 26, 2008, page 3.) However, Nakajima is concerned with decoding coded video data files (see Nakajima, Abstract) and not with compressing executable code. The cited portion of Nakajima describes that "the video data is ... processed by filling a given area with 0s." (Nakajima, column 6, line 23.) Applicant respectfully submits that the video data being processed in Nakajima is not comparable to the executable code of a firmware module. Video data that must be processed to produce an image is non-functional. Compressing the video data may cause the resulting image to be less accurate, but the functionality to produce the image is not contained within the compressed video data. In contrast, the subject of flattening in independent claims 1, 12, and 18 is a firmware module that performs a specified function. Replacement of the contents of a field within the MS-DOS header of the firmware module may render the firmware module unable to perform that specified function. Simply combining the techniques suggested in Nakajima with the firmware module taught by the combination of Rahman and PE/COFF would render the resulting firmware module inoperable in performing its intended function.

The examiner respectfully disagrees. Specifically, it is noted that the claims are not concerned with a loss of functionality in the MS-DOS header, see e.g. applicant's specification par. [0034] which states:

In one embodiment, all flags in MS-DOS header 22 are filled with zeros, except for Ifanew field 40 and e-magic field 44 ... the MS-DOS stub would typically contain a

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program ... However, since a firmware module need not run under that OS ... MS-DOS stub 40 may safely be flattened as described above.

Accordingly any loss of functionality resulting from the combination is the same loss of functionality provided by the claimed invention.

In the first full par. on pg. 9, the applicant states:

The Office Action acknowledges this difference by stating that Nakajima teaches "flattening a data file" rather than "flattening [a] firmware module." (See Office Action dated September 26, 2008, page 3.) Furthermore, the Office Action does not state how "the given area" of the video data file to be filled with 0s is identified. Because Nakajima does not teach "flattening the firmware module by replacing existing content within at least one field within the MS-DOS header of the firmware module with fill data that is more compressible than the existing content," all limitations of independent claims 1, 12, and 18 are not taught by the cited combination. Consequently, independent claims 1, 12, and 18 and their respective dependent claims 2-11, 13-17, and 19-23 are allowable for at least this reason. Applicant respectfully requests that claims 1-23 be allowed to pass to issuance.

The examiner respectfully disagrees. Initially it is noted that the claim does not recite a limitation requiring identifying a "given area". But regardless, PE/COFF discloses identifying the various claimed data fields (e.g. Section 3. "The PE file header consists of an MS-DOS stub") and the Nakajima teaches that replacing existing (unnecessary) data with 0's results in a more compressible file. Accordingly the applicants argument are not persuasive as one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In the par. bridging pp. 9 and 10 the applicant states:

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Claims 7-8, which depend from independent claim 1, were rejected under 35 USC § 103(a) as being unpatentable over the same combination of references used to reject claim 1 in combination with Nahapetian et al. (US Patent No. 6,654,386, hereinafter "Nahaetian"). Claim 7 has been canceled and the limitation previously included in claim 7, "merging at least two sections from an object file into one section of a firmware module" is now incorporated into amended claim 1. Columns 6, lines 23-26 of Nahapetian were cited for teaching "merging data sections of a file." Nahapetian deals with airplane data files that are formatted as frames and subframes, and data in the data file are rearranged to increase the file compression ratio. However, just as with the Nakajima reference, the Nahapetian reference does not deal with object files, firmware modules, or executable instructions. Compressing the airplane data may cause the resulting information gained from interpreting the data to be less accurate, but the functionality to process the data is not contained within the compressed data. Techniques used to make data files smaller cannot be simply applied to an object file without affecting the operation of the object file. Simply combining the techniques suggested in Nahapetian to object files with the simple data compression suggested in Nakajima and the firmware module taught by the combination of Rahman and PE/COFF would render the resulting firmware module inoperable in performing its intended function. Consequently, independent claims 1, 12, and 18 and their respective dependent claims 2-11, 13-17, and 19-23 are allowable for at least this reason. Applicant respectfully requests that claims 1-23 be allowed to pass to issuance.

The examiner respectfully disagrees. First it is noted that the examiner is unaware of (and the applicant has not supplied evidence of) any loss of data or accuracy associated with Nahapetian's compression techniques which would result in the destruction of functionality (see e.g. Nahapetian col. 8, lines 61-65 "the reverse of the flow diagram 200 can be used ... to reconstruct the frames and the subframes"). But regardless, as discussed above, any lost or destroyed functionality is also lost by the claimed method.

The applicant's additional arguments rely on this same "destruction of functionality" argument and are likewise unpersuasive.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 8 and 12-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Microsoft Portable Executable and Common Object File Format Specification” (PE/COFF) in view of US 5,901,310 to Rahman et al. (Rahman) in view of US 6,243,421 to Nakajima et al. (Nakajima) in view of US 6,654,386 to Nahapetian et al. (Nahapetian).

Regarding Claims 1, 12 and 18: PE/COFF discloses:

a firmware module, wherein the firmware module follows a portable executable (PE) format having subdivisions that include an MS-DOS header (Section 3. “The PE file header consists of an MS-DOS stub”);

storing a firmware module in memory (Section 3.4.1 “loading and running an executable file”); and

PE/COFF does not explicitly disclose a desire to compress the firmware module.

Rahman teaches a desire to compress firmware modules (col. 1, lines 48-51 “storing the firmware in compressed form”).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to store the PE/COFF firmware module (Section 3. "The PE file") in compressed form as taught by Rahman (col. 1, lines 48-51 "storing the firmware in compressed form"). Those of ordinary skill in the art would have been motivated to do so in order to "virtually increase[] the size of the nonvolatile semiconductor memory (e.g., a ROM) available for storing firmware" (Rahman col. 1, lines 48-51).

The PE/COFF-Rahman combination does not teach flattening the firmware module by replacing existing content within at least one field within the MS-DOS header of the firmware module with fill data that is more compressible than the existing content.

Nakajima teaches flattening a data file replacing existing content with fill data that is more compressible than the existing content (col. 6, lines 22-25 "filling a given area with 0s and its compressed, reduced form is saved ... which can hence be decreased in the storage size.")

It would have been obvious to one of ordinary skill in the art at the time the invention was made to flatten the PE/COFF firmware module (Section 3. "The PE file") as taught by Nakajima (col. 6, lines 22-25 "filling a given area with 0s"). Those of ordinary skill in the art would have been motivated to do so in order to further "virtually increase[] the size of the nonvolatile semiconductor memory" (Rahman col. 1, lines 48-51) by further

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compressing the file (Nakajima col. 6, lines 22-25 "decreased in the storage size.").

Note that the flattening necessarily requires accessing the firmware module.

The PE/COFF-Rahman-Nakajima combination does not teach merging at least two sections from an object file into one section in the firmware module.

Nahapetian teaches merging data sections of a file (col. 6, lines 23-26 "rearranging the data to be compressed"; col. 9, lines 20-23 "grouping multiple altitude parameters ... will provide a better format for compression").

It would have been obvious to one of ordinary skill in the art at the time the invention was made to merge at least two sections from the object file (PE/COFF Section 1, row 2 of the table "Object file") as taught by Nahapetian (col. 6, lines 23-26 "rearranging the data to be compressed"). Those of ordinary skill in the art would have been motivated to do so in order to further "virtually increase[] the size of the nonvolatile semiconductor memory" (Rahman col. 1, lines 48-51) by further compressing the file (Nahapetian col. 6, lines 23-26 "to increase the file compression ratio").

Regarding Claims 2, 13, 19: The rejection of claim 1, 12, 18, are incorporated respectively; further, in view of Nakajima's teaching (col. 6, lines 22-25 "filling a given area with 0s and its compressed, reduced form is saved ... which can hence be decreased in the storage size."), those of ordinary skill in the art would have realized

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that more fill data (i.e. "0s") would have resulted in more compression. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use at least fifty bytes of the fill data. Such a modification would produce only the expected results.

Regarding Claims 3-6, 14-17, 20-23: The rejections of claims 1, 12, 18 is incorporated respectively; Further, those of ordinary skill in the art would have known or been able to determine through reasonable experimentation which fields were unnecessary for the proper execution of the PE firmware module (PE/COFF Section 3. "The PE file") and thus could be replaced with the highly compressible fill data (Nakajima col. 6, lines 22-25 "0s"). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace any/all of the claimed fields with Nakajima's highly compressible data, thus further "virtually increase[] the size of the nonvolatile semiconductor memory" (Rahman col. 1, lines 48-51).

Regarding Claim 8: The rejection of claim 1 is incorporated; further PE/COFF discloses instructing a linker to generate the firmware module from the object file (PE/COFF Section 1, row 2 of the table "Object file", "The linker produces an image file").

It would have been obvious to one of ordinary skill in the art at the time the invention was made to instruct PE/COFF's linker (PE/COFF Section 1, row 2 of the table "The

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linker”) to merge the at least two sections as taught by Nahapetian (col. 6, lines 23-26 “rearranging the data to be compressed”). Those of ordinary skill in the art would have been motivated to do so in order to decrease the size of the resulting file (Nahapetian col. 6, lines 23-26 “to increase the file compression ration”; PE/COFF Section 1, row 7 of the table “With more sections, there is more file over head, but the linker is able to link in code more selectively”).

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Microsoft Portable Executable and Common Object File Format Specification” (PE/COFF) in view of US 5,901,310 to Rahman et al. (Rahman) in view of US 6,243,421 to Nakajima et al. (Nakajima) in view of US 6,654,386 to Nahapetian et al. (Nahapetian) in view of US 6,635,088 to Hind et al. (Hind).

Regarding Claim 9: The rejection of claim 8 is incorporated; further the PE/COFF-Rahman-Nakajima-Nahapetian combination does not disclose causing the linker to change a name of a section specified in the object file to a more compressible name.

Hind teaches replacing an original string with an alternate string, wherein the alternate string is more compressible than the original string (col. 5, lines 3-8 “substituting a unique entity name reference for each unique one of the located strings in the encoded file, provided that the first cost of substitution the located string is less than a second cost of using the located string without substitution”; also see Figs. 3A-B).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to cause the linker (PE/COFF Section 1, row 2 of the table "The linker") to replace a string representing the original section name (e.g. PC/COFF Section 7.2, row 3 of the 2nd table "the longname member, which consists of a series of null-terminated ASCII strings") with an alternate string representing the name of the section as taught by Hind (col. 5, lines 3-8 "substituting a unique entity name reference"). Those of ordinary skill in the art would have been motivated to do so in order to further "virtually increase[] the size of the nonvolatile semiconductor memory" (Rahman col. 1, lines 48-51) by reducing the file size (col. 5, lines 3-8 "the first cost of substitution the located string is less than a second cost of using the located string without substitution").

Regarding Claim 10: The rejection of claim 1 is incorporated; further PE/COFF discloses the PE format also includes an image page (Section 1, 1st row of the table "An image file can be thought of as a "memory image.""") and storing in the image page an original file path for the debug file (Section 5.4. 1st par. "A file may contain both a COFF Symbol Table and CodeView debug information").

The PE/COFF-Rahman-Nakajima-Nahapetian combination does not teach storing, in the image page, an alternate file path for a debug file wherein the alternate file path is more compressible than the original file path for the debug file.

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Hind teaches replacing an original string with an alternate string, wherein the alternate string is more compressible than the original string (col. 5, lines 3-8 “substituting a unique entity name reference for each unique one of the located strings in the encoded file, provided that the first cost of substitution the located string is less than a second cost of using the located string without substitution”; also see Figs. 3A-B).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace a string representing the original file path (e.g. PC/COFF Section 7.2, row 3 of the 2nd table “the longname member, which consists of a series of null-terminated ASCII strings”) with an alternate string representing the file path as taught by Hind (col. 5, lines 3-8 “substituting a unique entity name reference”). Those of ordinary skill in the art would have been motivated to do so in order to further “virtually increase[] the size of the nonvolatile semiconductor memory” (Rahman col. 1, lines 48-51) by reducing the file size (col. 5, lines 3-8 “the first cost of substitution the located string is less than a second cost of using the located string without substitution”).

Regarding Claim 11: The rejection of claim 1 is incorporated; further It would have been obvious to one of ordinary skill in the art at the time the invention was made to instruct the PC/COFF linker to perform the claimed actions (as discussed in the rejection of claim 10). Those of ordinary skill in the art would have been motivated to instruct the linker to do so because the linker is at least one of the objects responsible for producing the ultimate file to be compressed (Section 1, row 2 of the table “The

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linker produces an image file”). Such a modification would only produce the expected results (i.e. the ‘replacing’ would be performed by the linker instead of some unnamed application or object).

Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,901,310 to Rahman et al. (Rahman) in view of “Microsoft Portable Executable and Common Object File Format Specification” (PE/COFF) in view of US 6,243,421 to Nakajima et al. (Nakajima) in view of US 6,654,386 to Nahapetian et al. (Nahapetian).

Regarding Claim 24: Rahman discloses:

a machine accessible storage medium (Fig. 1, PCI Expansion ROM 24); and
a firmware module encoded in the machine accessible medium (col. 2, lines 52-58 “initialization code ... resides in ROM 24 on the device”).

Rahman does not disclose the firmware module having a portable executable (PE) format with subdivisions that include an MS-DOS header, wherein the firmware module was produced by operations comprising: flattening the firmware module by replacing existing content within at least one field within the MS-DOS header of the firmware module with fill data that is more compressible than the existing content.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a firmware module produced by the method discussed in the rejection of claim 1 as the firmware module disclosed by Rahman (col. 2, lines 52-58 “initialization code”) for the reasons discussed in the rejection of claim 1.

Regarding Claim 25: The rejection of claim 24 is incorporated; further Rahman discloses:

a processor communicatively coupled to the machine accessible medium (Fig. 1, Processor 15; PCI Local Bus 12);

memory communicatively coupled to the processor (Fig. 1, DRAM 26); and
instructions stored in the memory, wherein the instructions, when executed by the processor, cause the processing system to perform operations (col. 2, lines 1-2 “The firmware may be the BIOS for initializing and configuring a personal computer”)

comprising:

retrieving the firmware module from the machine accessible medium (col. 2, lines 52-58 “reads the code from ROM into the ... dynamic random access memory 26 (DRAM)”); and

executing the firmware module within a boot environment (col. 2, lines 52-58 “interprets the code.”).

Regarding Claim 26: The rejection of claim 24 is incorporated; further Rahman discloses:

the machine accessible medium comprises a non-volatile storage device (Fig. 1, PCI Expansion ROM 24); and

the apparatus further comprises an interface in communication with the non-volatile storage device, the interface operable to provide communication between the non-volatile storage device and a processor of a data processing system (Fig. 1, Bridge/Memory Controller 18; PCI Local Bus 12).

Regarding Claim 27: The rejection of claim 26 is incorporated; further Rahman discloses the apparatus comprises an adapter card for a processing system (Fig. 1, Graphics Adapter Board 20).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Mitchell whose telephone number is (571)272-3728. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bullock Lewis can be reached on (571) 272-3759. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Mitchell/
Examiner, Art Unit 2193

/Lewis A. Bullock, Jr./
Supervisory Patent Examiner, Art Unit 2193